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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,565	01/15/2004	Purusottam Sahoo		5904

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EXAMINER

MCNEIL, JENNIFER C

ART UNIT PAPER NUMBER

1775

DATE MAILED: 05/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application No. 10/758,565	Applicant(s) SAHOO ET AL	
	Examiner Jennifer C. McNeil	Art Unit 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 April 2005.  
 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-11 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### *Claim Objections*

Claims 2, 4, 6, 7, and 9 are objected to because of the following informalities: Claim 2 contains the term "resistant" in line 2. Should this be --resist--? Claim 4, line 2, should "o.010" be --0.010--? Claim 6, line 1, should --the-- follow "wherein"? Regarding claims 7 and 9, is NiCoCrAlY actually MCrAlY? What is M? Claim 9, line 6, is the thickness referring to the bond coat or they intermediate layer? Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 7 are rejected under 35 U.S.C. 102(a) as being anticipated by Schaeffer et al (US 2003/0027013). Schaeffer teaches a thermal barrier coating comprising a top layer formed of YSZ and containing dense vertical cracks. A layer of alumina is formed over a bond coat of MCrAlY and under the YSZ layer, and is considered a crack arresting layer.

Claims 1-3, and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Subramanian (US 6,703,137). Subramanian '137 teaches a thermal barrier coating comprising a less dense bottom layer (20) and a more dense top layer (22) with a plurality of segmentation gaps (considered cracks). The

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bottom layer is considered a crack resistant layer as it is composed of the same material as that of applicant's instant disclosure. Furthermore, regarding claims 2 and 3, the bottom layer comprises pores that may be formed by incorporation of polyester into the layer. A bond coat of MCrAlY is formed between the substrate and the thermal barrier coating.

Claims 1, 2, 4, 5, and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Subramanian (US 6,716,539). Subramanian '539 teaches a thermal barrier coating having a porous first layer and a second relatively dense layer having a plurality of gaps. Both layers comprise ceramic insulating material YSZ. The first layer comprises pores which serve to arrest the propagation of cracks originating at the vertical gaps. Regarding claims 4 and 5, the first (intermediate) layer may be applied in 1-4 passes of 1-5 mils (0.001-0.0005 inches) per pass. In other words, the first layer may have a thickness of 1-20 mils (0.001-0.02 inches). A bond coat of MCrAlY is formed between the substrate and the thermal barrier coating.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schaeffer et al (US 2003/0027013) in view of Vine et al (US 4,936,745). Schaeffer teaches a thermal barrier coating with a bond coat of MCrAlY but does not give additional examples of bond coatings that may be used. Vine teaches a bond coating for a thermal barrier coating system comprising MCrAlY which may include additions of Hf and Si. The bond coat may be applied with a thickness of 5-10 mils (0.005-0.010 inches).

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As it is taught by Vine that a MCrAlY layer having additions of Hf and Si is readily used as a bond coating for a thermal barrier coating system, one of ordinary skill in the art at the time of the invention would have found it obvious to use a bond coat of this type in the coating of Schaeffer with the full expectation that it would successfully provide adherence of the ceramic coating.

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian (US 6,703,137) in view of Subramanian (6,716,539). Subramanian '137 teaches a thermal barrier coating having a bottom and top layer as described above, but does not give specific thicknesses for these layers. Subramanian '539 teaches a thermal barrier coating having a first and second layer similar to that of Subramanian '137 and teaches that the thickness of the first layer may be 1-20 mils and the second layer may be 3-25 mils. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the coatings of Subramanian '137 with thicknesses similar to that of Subramanian '539 since the layers of Subramanian '539 have a thickness sufficient to provide protection of the underlying substrate.

Claims 6, and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian (US 6,703,137) in view of Vine et al (US 4,936,745). Subramanian '137 teaches a bond coat of MCrAlY but does not give additional examples of bond coatings that may be used. Vine teaches a bond coating for a thermal barrier coating system comprising MCrAlY which may include additions of Hf and Si. The bond coat may be applied with a thickness of 5-10 mils (0.005-0.010 inches). As it is taught by Vine that a MCrAlY layer having additions of Hf and Si is readily used as a bond coating for a thermal barrier coating system, one of ordinary skill in the art at the time of the invention would have found it obvious to use a bond coat of this type in the coating of Subramanian '137 with the full expectation that it

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would successfully provide adherence of the ceramic coating. Regarding claims 10 and 11, the articles of both Subramanian '137 and '539 are used for turbine engine components.

Claims 6, and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian (US 6,716,539) in view of Vine et al (US 4,936,745). Subramanian '539 teaches a bond coat of MCrAlY but does not give additional examples of bond coatings that may be used. Vine teaches a bond coating for a thermal barrier coating system comprising MCrAlY which may include additions of Hf and Si. The bond coat may be applied with a thickness of 5-10 mils (0.005-0.010 inches). As it is taught by Vine that a MCrAlY layer having additions of Hf and Si is readily used as a bond coating for a thermal barrier coating system, one of ordinary skill in the art at the time of the invention would have found it obvious to use a bond coat of this type in the coating of Subramanian '539 with the full expectation that it would successfully provide adherence of the ceramic coating. Regarding claims 10 and 11, the articles of both Subramanian '137 and '539 are used for turbine engine components.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian (6,716,539) in view of Subramanian (US 6,703,137). Subramanian '539 teaches a porous bottom layer as discussed above, but does not teach how the porosity is provided. Subramanian '137 teaches a porous first (bottom) layer similar to that of Subramanian '539, and further teaches that the porosity is formed by providing polyester in the layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to form the porosity of the bottom layer of Subramanian '539 by using polyester as taught by Subramanian '137, as it is clearly taught to successfully provide porosity in a zirconia layer and adhered to an underlying MCrAlY layer.

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*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer C. McNeil whose telephone number is 571-272-1540. The examiner can normally be reached on 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jennifer McNeil  
April 27, 2005